US DEPARTMENT OF AGRICULTURE
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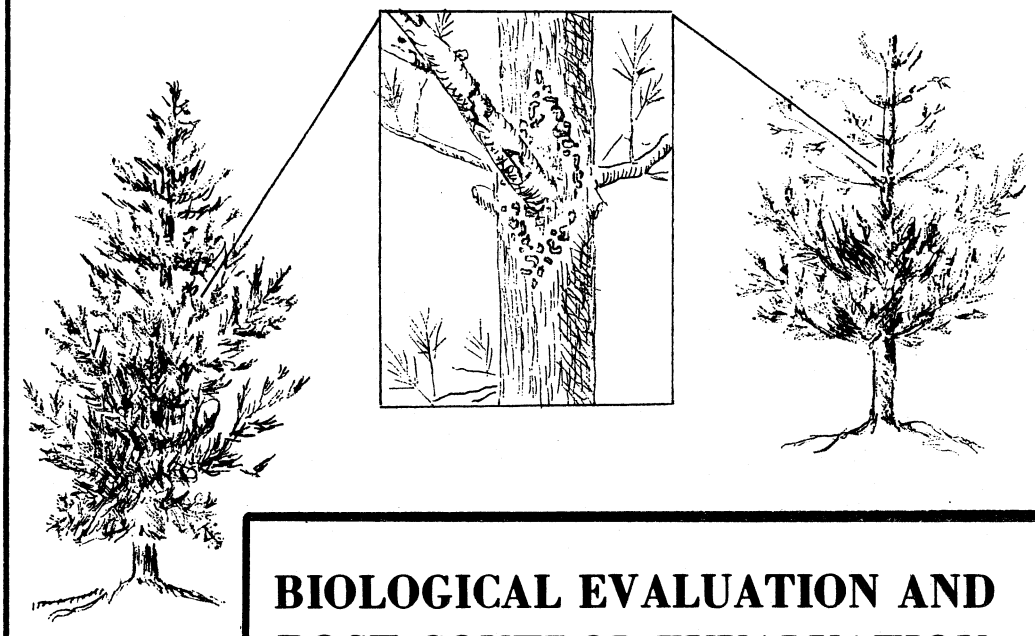
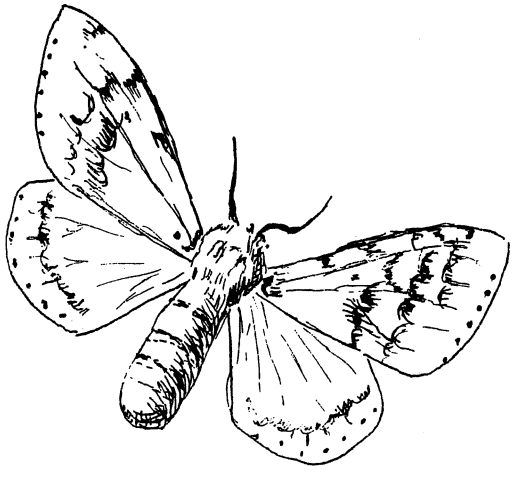
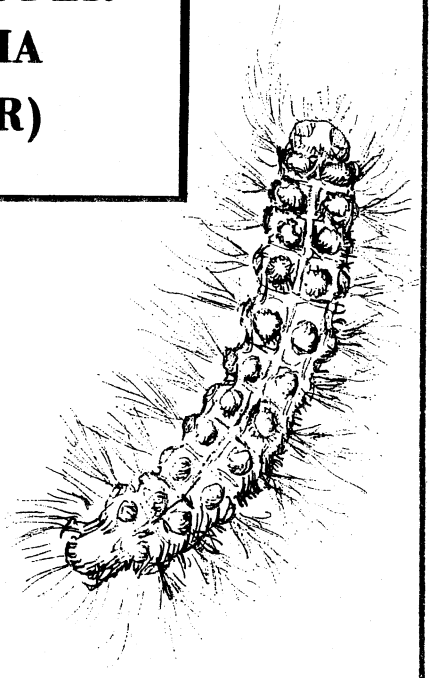


BIOLOGICAL EVALUATION AND POST CONTROL EVUALUATION OF THE PITCH PINE LOOPER LAMBDINA ATHASARIA PELLUCIDARIA (G & R)





NORTHEASTERN AREA, State & Private Forestry

Environmental Protection & Improvement Unit, Forest Pest Management Group

P-73-4

BIOLOGICAL EVALUATION
AND
POST-CONTROL EVALUATION
OF THE PITCH PINE LOOPER
LAMBDINA ATHASARIA PELLUCIDARIA (G. & R.)

by

PARKER SNOWDEN

Entomologist

Portsmouth Field Office

December 1973

ABSTRACT

At the request of the Air Force, a larval survey of the pitch pine looper was conducted on July 19-20, 1973 on Otis Air Force Base, Massachusetts to determine whether the loopers would be present in sufficient numbers to cause serious defoliation of pitch pine in 1973. The results of this survey indicated that moderate to severe defoliation would occur. Considering these results, Air Force personnel made the decision to initiate a suppression project. On August 4, 1973, an Air Force fixed wing military aircraft applied 95% malathion at the rate of 8 fluid ounces per acre against the 2nd and 3rd instar larvae. Pre- and post-spray larval surveys indicated that the treatment was effective, reducing the existing larval population by 95%.

INTRODUCTION

Although references on the biology and control of the pine looper are limited, this insect is known to cause serious defoliation on pitch, red, shortleaf, Virginia loblolly and other pines occurring along the Atlantic Coast. Since first recorded by Dyar in 1900, sporadic outbreaks have occurred in pine stands in New Jersey, Delaware, Long Island, New York, Connecticut and Massachusetts. The infestation presently occurring on Cape Cod, Massachusetts evidently is a recurring problem on the Cape, with the looper reappearing in epidemic numbers after several years of low population levels. The current infestation on the Cape began in 1970. In 1972, approximately 43,100 acres on Cape Cod were severely defoliated by this insect. In August 1972, 13,100 acres of pitch pine (Pinus rigida Mill.) on Otis Air Force Base were aerially treated with 95% malathion by the Air Force. Results of the spray operation were reported to be unsatisfactory.

In July 1973, we were requested by the Air Force to conduct a larval survey of the pine looper on Otis Air Force Base. Results of the larval survey indicated that moderate to severe defoliation could be expected on the Base if the trees were not treated. On this basis, Air Force personnel* made a decision to aerially spray the infested area using Malathion. The area was sprayed on August 4, 1973. A post-suppression larval survey was made on August 16 and 17 to determine the effectiveness of the treatment.

Mr. Donald Moncevicz, an Otis Environmental Co-ordinator, assisted us in locating sampling areas, providing us with maps of the Base, and other pertinent materials. Larval surveys were carried out by personnel from the FPM staff of the Portsmouth Field Office.

This report summarizes results of the biological and post suppression evaluations.

TREATMENT

The total area of Otis Air Force Base is 21,215 acres with approximately 15,000 acres forested. Except within the immediate confinement of Camp Edward, a part of Otis Air Force Base, and residential areas, 15,000 acres (approx.) were treated. Temporary headquarters for the ground operation was the Base Civil Engineer Facility.

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* Spray team consisted of LTC L. W. Trager and his assistants, 355-TAS-Spray, Lockbourne Air Force Base, Ohio

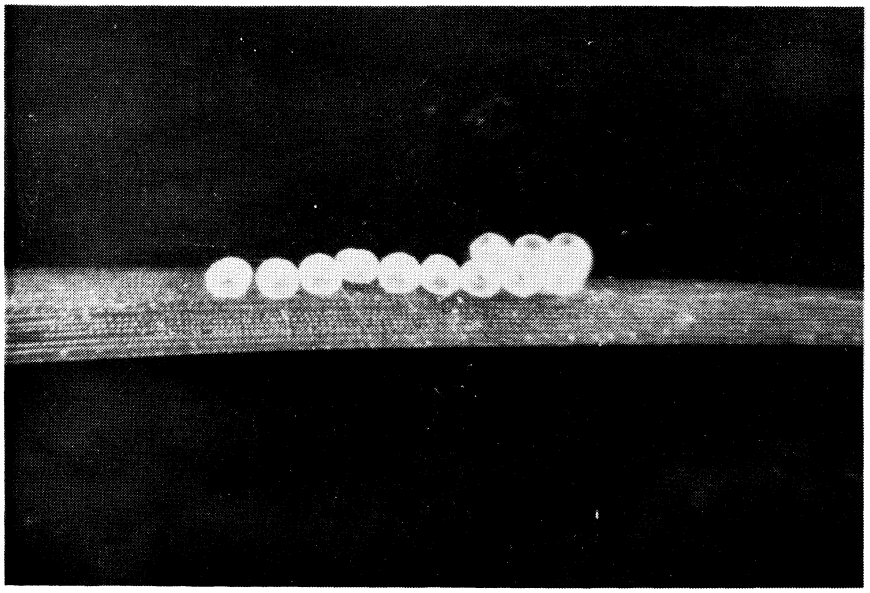

Fig. 1 Pine looper egg mass. Note lack of opercula on top of eggs through which eclosion occurred.

Because the base is delineated by several ready references such as roads, highways, railroads, and ponds, marking the spray area was not necessary. Prior to actual spraying, several reconnaissance flights were flown over the base by the special aerial spray flight team for purposes of orientation.

According to the Air Force, one fixed-wing (C-123) Air Force military aircraft was used on this project. The aircraft was calibrated upon arrival at Otis Air Force Base.

The aircraft was equipped with #8006 flat fan nozzles (number of nozzles unknown) and was flown at an air speed of 130 knots (150 mph) at a spray height of 200 feet above the canopy with a swath width of 1000 feet. The base was sprayed north to south.

The insecticide was applied between 2-3 p.m. on August 4, 1973 after four consecutive days of bad weather. A low overcast prevailed during application, but no rain occurred.

METHODS

Clusters of five trees in each of 13 randomly selected areas on the Base were sampled to determine larval population density. Individual trees were identified with painted numbers and flagging to facilitate re-examination, should the Air Force decide to spray. All sample trees were well within the boundary of the spray area. Larval counts were made on two eighteen-inch branch terminals cut from each tree, for a total of 130 branches. Branch samples were taken and larval counts made 15 days before spraying (July 19-20, 1973) and 13 days after the spraying (August 16-17). Branch samples were randomly selected and cut from the middle crown third of trees, and dropped onto a 5'x4' plastic drop sheet held by an assistant.

The average height of the pitch pines sampled was 15 feet.

No plots were established in the impact area of the artillery range due to the danger of unexploded shellheads and other ammunition.

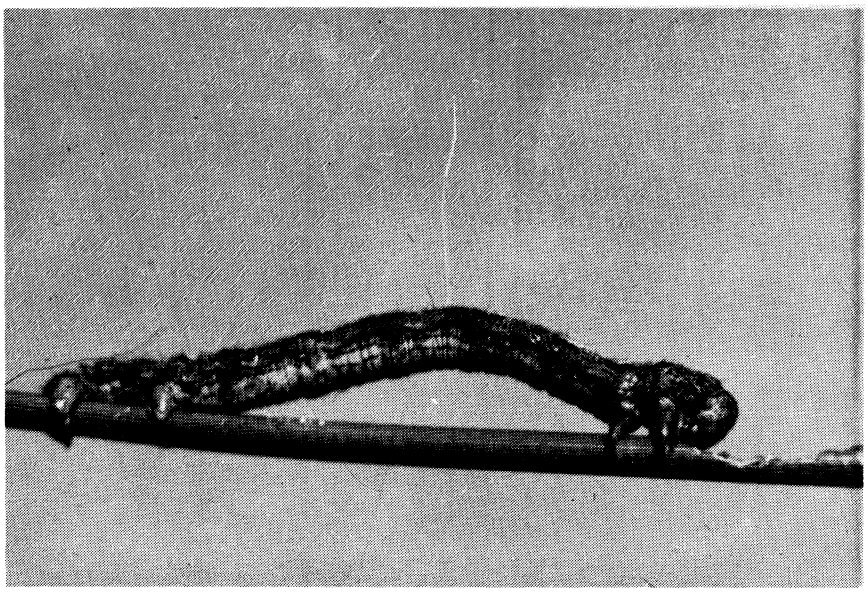

Fig. 2 Seventh instar larvae of pine looper feeding on a pitch pine needle. (Approximately 37mm long.)

PRE- AND POST-SUPPRESSION LARVAL COUNTS

Approximately 95% of the larvae were in the 2nd instar on June 19-20 when the pre-spray count was taken. The insecticide was applied on August 4th, when more than half of the larvae were in the 2nd and 3rd instars. The same trees were sampled again on August 16-17, 1973 thirteen days after the treatment, to obtain number of living larvae present.

CHEMICAL USED

Technical Malathion Low Volume^{R} Conc. was used during the operation. The insecticide consisted of 95.0% active malathion (Cythion - premium grade malathion and 5% inert ingredient). One gallon of this formulation contained 9.7 lbs. of malathion. The material was applied at a rate of 8 fluid ounces per acre.

RESULTS

Results of the larval survey conducted July 19-20, 1973 on pine looper indicated that moderate (60%) to severe (80%) defoliation could be expected on the Base if trees were not treated. On the 139-18" pitch pine branches sampled, the average number of living larvae was 4.3 ± 0.4.

Results of the post-suppression survey made August 16-17 indicated that there was a 95% reduction in the larval population. Average number of living larvae found per 18" branch was 0.22 ± 0.05. Total acres defoliated by this insect on Cape Cod in 1973 may exceed 1972 defoliation.

DISCUSSION

When this survey was conducted July 19-20, 1973, 95% of the larvae were in the 2nd instar and average current defoliation was 4.2%. Since these larvae have seven instars reaching a length of 25-37mm. long before pupation, each instar could probably consume twice as much as the previous one. Thus, if 5% of the foliage is consumed in the 2nd instar, 80-100% of the trees could have been severely defoliated by the 7th instar larvae.

An 18" branch segment appeared to be a satisfactory sampling unit in determining larval population. A 15" branch sample would be too short without cutting a portion of the foliage cluster. Pitch pine foliage generally grows in series of 3-5 clusters of needles per whorl, at the node, averaging approximately 18-22" in length. The possibility of encountering

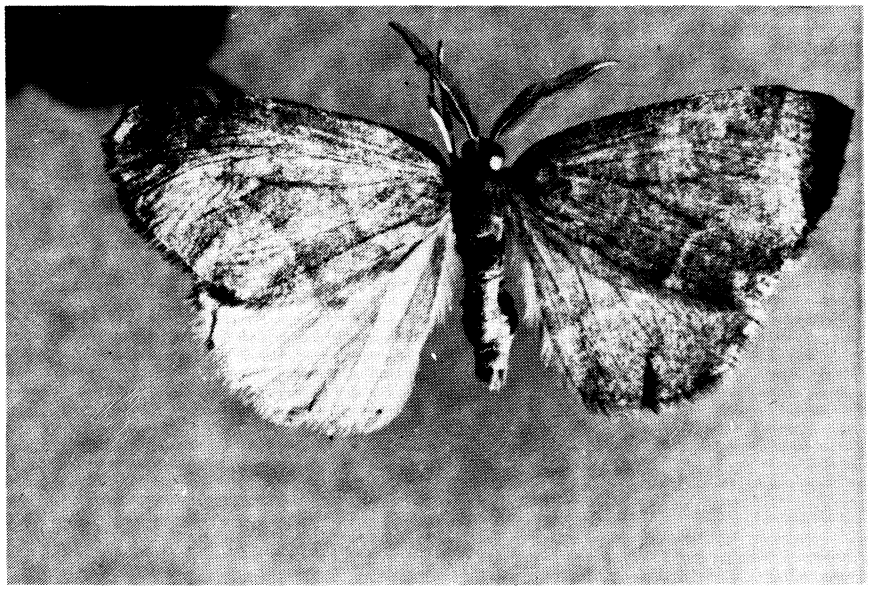

Fig. 3 Adult male moth of pine looper

zero larval counts would be greater using a 15" branch than with an 18" branch. A longer (24-30") branch segment would be difficult to cut with the pole pruner and would be time consuming to evaluate.

Spray operations for pine looper suppression on Cape Cod were not confined to Otis Air Force Base. The Town of Bourne, Sandwich, Mashpee, and Barnstable also sprayed for this insect. These towns aerially treated several thousand acres of pitch pine with Sevin 4-oil at a rate of 1.0 pound per acre.

Post-suppression larval counts were obtained from 10 check plots established outside the spray area - four plots in Falmouth and six in Myles Standish State Forest, Plymouth. Mean larval counts per 60-18" branch, 3 trees per plot was 0.42. Time did not permit us to establish check plots before the spray project. Therefore, knowledge of the survival rate in the check areas is unknown. It was also difficult to find areas outside the Base supporting sufficient pitch pine looper population that would not be subject to treatment.

Extensive foliage damage caused by the pitch pine looper was evident throughout the Base. Tree mortality was also scattered on the Base but it would be difficult to state whether tree mortality can be attributed to the repeated infestations of pine looper or a combination of several infestations of pine looper, Nantucket pine top moth and pine webworm, and environmental conditions.

Information compiled in this evaluation will be kept on file at the Portsmouth Field Office, Portsmouth, New Hampshire.

RECOMMENDATIONS

1. Portsmouth Field Office should work more closely (as time and personnel permit) with Otis Air Force Base, Massachusetts Department of Natural Resources and other state cooperators to obtain more knowledge on the biology and control of this insect.

2. Civil Engineer Facility Building personnel, Otis Air Force Base, should continue to maintain surveillance of the pine looper on the Base and report any unusual infestation to the Portsmouth Field Office.

REFERENCES

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